



U.S. Department
of Transportation
Federal Highway

Administration

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Washington, D.C.
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Refer to: HSA-1\WZ-76

MR. KEN RUSSELL
VICE PRESIDENT
3D SPECIALTIES
1110 25TH AVENUE NORTH
FARGO, ND 58107-1408

Dear Mr. Russell:

Thank you for your January 26 and February 27 letters to Mr. Nicholas Artimovich of my staff requesting Federal Highway Administration (FHWA) acceptance of your company's Type III barricades as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letters were photographs and drawings of the barricade, which is nominally identical to the perforated square steel tube (PSST) barricade with aluminum panels accepted in our letter WZ-55 to the State of Minnesota dated December 18, 2000. However, you requested that we find your company's Type III barricade acceptable with two significant modifications to the tested barricades. The first was to substitute "crossbuck panels" for the horizontal rails and the second was to use (8 ft) long extruded panels. You requested acceptance for use on the NHS under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Introduction

The FHWA guidance on crash testing of work zone traffic control devices is contained in two memoranda. The first, dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features," established four categories of work zone devices: Category I devices were those lightweight devices which could be self-certified by the vendor, Category II devices were other lightweight devices which needed individual crash testing, Category III devices were barriers and other fixed or massive devices also needing crash testing, and Category IV devices were trailer mounted lighted signs, arrow panels, etc. The second guidance memorandum was issued on August 28, 1998, and is titled "INFORMATION: Crash Tested Work Zone Traffic Control Devices." This later memorandum lists devices that are acceptable under Categories I, II, and III.

A brief description of the tested Type III barricade follows:

A 1829 mm wide x 1528 mm deep x 1594 mm tall (72 x 60 x 62.75 in) Type III barricade. Vertical uprights are 38.13 mm x 38.13 mm x 3.07 mm wall x 1524 mm long (1.5 x 1.5 x 1/8 x 60 in) galvanized steel Telespar posts. Horizontal legs are 44.67 mm x 44.67 mm x 1.93 mm wall x 1528 mm long (1.75 x 1.75 x 14 gage x 60 in) galvanized steel Telespar posts. To each leg is welded a 305 mm long (12 in) stub of like Telespar post. The uprights are inserted into

these stubs with no bolts or other fasteners being used. Three 230 mm wide x 1829 mm long (9 x 72 in) aluminum extruded panels are fastened to the uprights using 50.8 mm (1 in) corner bolts. When completed the uprights are 1257 mm (50 in) apart, out-to-out. A 20.4 kg (45 lb) bag of sand was placed as ballast near the end of each leg.

Modifications:

You requested two modification of the above barricade:

Modification A: Use of “crossbuck” section rails. These extruded aluminum sections are 229 mm (9 in) wide and have four protrusions on the face that are 19 mm (3/4 in) deep. When we asked the Midwest Roadside Safety Facility (MWRSF), (the organization that conducted the test on the Minnesota Type III barricades) if they thought the crossbuck section would be an acceptable alternative to the tested “dog bone” section, they replied:

“We have looked at the new proposed panel configuration and come up with several potential concerns. First, with protruding horizontal ridges in the panel members, the potential exists for the panels to slap down onto the windshield with very concentrated forces when impacted at 0 degrees or perpendicular to the vehicle travel. Second, since the geometrical section properties likely differ from the dog-bone shape, there exists the potential for different performance when the panel impacts the windshield at 90 degrees or parallel to the vehicle travel. In this case, the panels may not buckle, collapse, or bend in a similar manner to those previously tested with the dog-bone shape. The same could be stated if we were to change the thickness of the dog-bone panels. Thus, with these differences in geometry, I would recommend that the system be full-scale crash tested with an actual car and windshield.”

We concur in their assessment, and deny the use of crossbuck panels unless crash tested.

Modification B: The use of 2438 mm (8 ft) long aluminum extruded panels.

The MWRSF tested the Type III barricade using 1829 mm (6 ft) long extruded aluminum “dog bone” panels. You requested the use of the identical design barricade using 2438 mm (8 ft) long aluminum panels of the same design. We have reviewed the MWRSF report and conclude that the Type III barricade could be expected to perform in an acceptable manner if the longer panels were used. There are two important limitations that we must add: 1) The “extended” Minnesota Type III barricade may not be used with a sign panel unless tested, and 2) The panels should not extend more than 0.3 m (approximately one ft) beyond the PSST uprights. The crash test performance of the barricade with sign indicated that there could be a real risk of significant windshield damage if these two limitations are not observed.

Findings

Damage of the MWRSF tests of the Minnesota Type III barricades was limited to cosmetic sheet metal damage and minor windshield cracking. We expect that the same barricade using the 2438 mm long panels will perform in a similarly acceptable manner. Therefore, the extended

Type III barricade (Modification B) described above and shown in the enclosed drawings for

reference is acceptable for use as Test Level 3 devices on the NHS under the range of conditions tested and limitations noted above, when proposed by a State.

Please note the following standard provisions which apply to FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-76 shall not be reproduced except in full. This letter, and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.

Sincerely yours,

Frederick G. Wright, Jr.
Program Manager, Safety